



PUBLIC NOTICE

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DA 23-323
April 13, 2023

ERRATUM

IB Docket No. 16-185

On April 12, 2023, the Office of International Affairs released a Public Notice, **DA 23-296**, seeking comment on the draft recommendation provided by the World Radio Conference-23 (WRC-23) Advisory Committee in Attachment A and on the National Telecommunications and Information Administration (NTIA) draft proposals in Attachment B. One of the WRC-23 Advisory Committee recommendations on AI 1.16 was inadvertently not included in the Attachment A. This Erratum corrects the Attachment A and includes the recommendations on AI 1.16 (pages 119 to 141 of the Attachment A).

The deadline for comments on the proposed recommendations remains as **April 21, 2023**. It is necessary that all comments be received by **April 21, 2023**, in order to allow sufficient time to finalize the U.S. position before commencement of regional WRC-23 preparatory meetings.

For further information, please contact Dante Ibarra at (202) 418-0610 or by email at: WRC-23@fcc.gov.

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ATTACHMENT (A)**DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE**

Agenda Item 1.16

1.16 to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by non-GSO FSS earth stations in motion, while ensuring due protection of existing services in those frequency bands, in accordance with Resolution 173 (WRC-19);

Background

ESIMs (earth stations in motion) under WRC-23 Agenda Item 1.16 are earth stations that communicate with non-geostationary (non-GSO) space stations in the fixed-satellite service (FSS) in the bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (all space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (all Earth-to-space), while operating on moving platforms. As a result, they are treated differently as they can introduce a different interference environment from earth stations which are of specific or typical fixed type operating within the fixed-satellite service.

In accordance with *resolves* 3 of Resolution 173 (WRC-19), sharing and compatibility studies considered only aeronautical and maritime ESIMs (land ESIMs were not studied), taking into account the need to ensure the protection of , and not impose undue constraints on, services allocated in the frequency bands.

ESIMs communicating with non-GSO space stations in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) can be used to provide broadband communications to mobile platforms. The interference environment resulting from the operation of non-GSO aeronautical and maritime ESIMs has been studied in the ITU-R, and the following proposals reflect the technical, operational and regulatory provisions necessary to ensure the cross-border protection of incumbent services, including terrestrial services, from the operation of aeronautical and maritime ESIMs with non-GSO space stations in these frequency bands.

Proposals:

USA/1.16/1 MOD

ARTICLE 5

Frequency allocations**Section IV – Table of Frequency Allocations**

(See No. 2.1)

15.4-18.4 GHz

Allocation to services		
Region 1	Region 2	Region 3
...		
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A <u>ADD 5.A116</u> (Earth-to-space) 5.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) 5.517 5.517A <u>ADD 5.A116</u> (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A <u>ADD 5.A116</u> (Earth-to-space) 5.516 MOBILE
	17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A <u>ADD 5.A116</u> (Earth-to-space) 5.516 MOBILE 5.519	
18.1-18.4	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A <u>ADD</u> <u>5.A116</u> (Earth-to-space) 5.520 MOBILE 5.519 5.521	

MOD**18.4-22 GHz**

Allocation to services		
Region 1	Region 2	Region 3
18.4-18.6	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A <u>ADD 5.A116</u> MOBILE	
...		
18.8-19.3	FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.523A <u>ADD 5.A116</u> MOBILE	
...		
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A <u>ADD 5.A116</u> Mobile-satellite (space-to-Earth) 5.524	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A <u>ADD 5.A116</u> MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 5.529	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A <u>ADD 5.A116</u> Mobile-satellite (space-to-Earth) 5.524
20.1-20.2	FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A <u>ADD 5.A116</u> MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528	
...		

Reasons: To modify the Table of Frequency Allocations in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz, and 19.7-20.2 GHz to add a footnote concerning the use of FSS space-to-Earth frequency bands for non-GSO space stations communicating with aeronautical and maritime ESIM.

USA/1.16/2 MOD**24.75-29.9 GHz**

Allocation to services		
Region 1	Region 2	Region 3
...		
27.5-28.5	FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.539 <u>ADD 5.A116</u> MOBILE 5.538 5.540	

28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.523A 5.539 <u>ADD 5.A116</u> MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540		
...		
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 <u>ADD</u> <u>5.A116</u> Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 <u>ADD</u> <u>5.A116</u> MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.525 5.526 5.527 5.529 5.540	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 <u>ADD</u> <u>5.A116</u> Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542

Reasons: To modify the Table of Frequency Allocations in the frequency bands 27.5-29.1 GHz and 29.5-29.9 GHz to add a footnote concerning the use of aeronautical and maritime ESIM communicating with non-GSO FSS space stations.

USA/1.16/3 MOD

29.9-34.2 GHz

Allocation to services		
Region 1	Region 2	Region 3
29.9-30	FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 <u>ADD 5.A116</u> MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542	

Reasons: To modify the Table of Frequency Allocations in the frequency band and 29.9-30 GHz to add a footnote concerning the use of aeronautical and maritime ESIM communicating with non-GSO FSS space stations.

USA/1.16/4 ADD

5.A116 The operation of earth stations in motion communicating with non-geostationary fixed-satellite service space stations in the bands 17.7-18.6 GHz (space-to-Earth), 18.8-19.3 GHz (space-to-Earth) and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz (Earth-to-space) and 29.5-30 GHz (Earth-to-space) shall be subject to Resolution [A116] (WRC-23).

Reasons: To add a new footnote enabling the use of aeronautical and maritime ESIM in the mentioned FSS bands communicating with non-GSO space stations subject to new WRC-23 draft Resolution [A116] (WRC-23).

USA/1.16/5 ADD

RESOLUTION [A116] (WRC-23)

Use of the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service

The World Radiocommunication Conference (Dubai, 2023),

considering

- a) that there is a need for global broadband mobile satellite communications, and that some of this need could be met by allowing earth stations in motion (ESIMs) to communicate with space stations of non-geostationary satellite orbit (non-GSO) fixed-satellite service (FSS) systems operating in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (all space-to-Earth) and 27.5-29.1 GHz and 29.5-30.0 GHz (all Earth-to-space);
- b) that the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (all space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (all Earth-to-space) are allocated to space services; the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz, and 27.5-29.1 GHz are allocated to terrestrial services on a primary basis worldwide; in the countries identified in No. 5.524 of the Radio Regulations, the band 19.7-20.2 GHz is allocated to the fixed and mobile services on a primary basis; and, in the countries identified in No. 5.542 of the Radio Regulations, the band 29.5-30 GHz is allocated to the fixed and mobile services on a secondary basis;
- c) that the frequency bands in *considering* b) are used by a variety of different systems and these existing services and their future development need to be protected, without any undue constraints, from the operation of non-GSO ESIMs;
- d) there is no specific regulatory procedure for the coordination of non-GSO ESIMs relative to terrestrial stations for these services;
- e) that the frequency band 18.6-18.8 GHz is allocated to earth exploration-satellite service (EESS) (passive) and the space research service (SRS) (passive) and that these services need to be protected from operation of non-GSO FSS space-to-Earth links towards ESIMs;
- f) that the ITU Radiocommunication Sector (ITU-R) has studied the technical and operational requirements for aeronautical and maritime earth stations in motion communicating with non-GSO FSS systems in the frequency bands 17.3-18.6 GHz, 18.8-19.3 GHz, and 19.7-20.2 GHz (all space-to-Earth), and 27-29.1 GHz and 29.5-30 GHz (all Earth-to-space);

g) that appropriate regulatory and interference-management mechanisms, including necessary mitigation measures, are required for the operation of non-GSO ESIMs to protect other space and terrestrial services that are allocated on a primary basis in the Radio Regulations in the frequency bands mentioned in *considering a)*,

considering further

a) that administrations intending to authorize non-GSO ESIMs, when establishing national licensing rules, may consider adopting other interference management procedures and/or mitigation measures than those contained in this Resolution as long as the provisions in Annex 1 are unchanged in cross-border applications;

b) that it is important to identify the responsibilities of the entities involved in the operation of aeronautical and maritime non-GSO ESIMs;

c) that aeronautical and maritime ESIMs operating within the service area of the FSS systems with which they communicate may provide service within the territories under the jurisdiction of multiple administrations/countries;

d) that the operation of an ESIM within the territory under the jurisdiction of administration/countries mentioned in *considering further a)* above is subject to obtaining authorization from that administration/country;

e) that this Resolution does not establish any technical or regulatory provisions for the operation and use of land ESIMs communicating with non-GSO FSS space stations; and any authorization of land ESIMs remains strictly a national matter in the frequency bands subject to this resolution;

recognizing

a) that the administration authorizing non-GSO ESIMs on the territory under its jurisdiction has the right to require that non-GSO ESIMs referred to above only use those assignments associated with non-GSO FSS systems which have been successfully coordinated, notified, brought into use and recorded in the MIFR with a favourable finding under Articles 9 and 11, including Nos. 11.31, 11.32 or 11.32A, where applicable;

b) that for cases of incomplete coordination under No. 9.7B of the non-GSO FSS system with which non-GSO ESIMs communicate, the operation of non-GSO ESIMs in the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz (space-to-Earth) needs to be in accordance with the provisions of No. 11.42 with respect to any recorded frequency assignment which was the basis of the unfavourable finding under No. 11.38;

c) that No. 22.2 applies for the protection of geostationary-satellite networks in the fixed-satellite service (GSO FSS) and the broadcasting-satellite service (GSO BSS) operating in the frequency band 17.7-17.8 GHz from unacceptable interference caused by non-GSO ESIMs;

d) that under the provisions of No. 22.2, non-GSO ESIMs in the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz, shall not claim protection from GSO FSS and GSO BSS networks operating in accordance with these Regulations, and non-GSO ESIMs in the frequency bands 27.5-28.6 GHz and 29.5-30 GHz shall not cause unacceptable interference to GSO FSS and GSO BSS networks operating in accordance with these Regulations. No. 5.43A does not apply in these cases;

- e) that any course of action taken under this Resolution has no impact on the original date of receipt of the frequency assignments of the non-GSO FSS satellite system with which non-GSO ESIMs communicate or on the coordination requirements of that satellite system;
- f) that successful compliance with this Resolution does not oblige any administration to authorize/license any non-GSO ESIM to operate within the territory under its jurisdiction (*see resolves 3*);
- g) that a non-GSO FSS system operating in the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-28.6 GHz and 29.5-30 GHz (Earth-to-space) in compliance with the epfd limits referred to in Nos. **22.5C**, **22.5D** and **22.5F** is considered as having fulfilled its obligations under No. **22.2** with respect to any geostationary-satellite network;
- h) that the use of the frequency bands 18.8-19.3 GHz (space-to-Earth) and 28.6-29.1 GHz (Earth-to-space) by GSO FSS networks is subject to Nos. **9.12A** and **9.13**, and No. **22.2** does not apply;
- i) that for the use of the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30.0 GHz (Earth-to-space) by non-geostationary fixed-satellite service systems, including those operating ESIMs, No. **9.12** applies,

recognizing further

- a) that under *resolves 1.1.3* of this Resolution, frequency assignments to ESIMs need to be notified to the Radiocommunication Bureau;
- b) that for the operation of ESIMs, notification of any frequency assignment under Article **11** of the Radio Regulations shall only be made by one single administration;
- c) that, an administration authorizing the operation of ESIMs within the territory under its jurisdiction may modify/withdraw that authorization at any time;

resolves

- 1 that, for any aeronautical and/or maritime ESIMs communicating with non-GSO FSS space stations referred to in this Resolution within the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space), or parts thereof, the following conditions shall apply:
- 1.1 with respect to space services in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz (all space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (all Earth-to-space), and in their adjacent band 18.6-18.8 GHz, non-GSO ESIMs shall comply with the following conditions:
- 1.1.1 with respect to satellite networks or systems of other administrations, non-GSO ESIMs' characteristics shall remain within the envelope characteristics of typical earth stations associated with the non-GSO FSS system with which these ESIMs communicate;
- 1.1.1.1 for the implementation of *resolves 1.1.1* above, the notifying administration for the non-GSO FSS system with which the non-GSO ESIMs communicate shall, in accordance with this Resolution, send to the Radiocommunication Bureau (BR) the relevant Appendix **4** notification information related to the characteristics of the non-GSO ESIMs intended to communicate with that non-GSO FSS system, together with the commitment that the operation shall be in conformity with the Radio Regulations, including this Resolution;

- 1.1.1.2 upon receipt of the notification information referred to in *resolves* 1.1.1.1 above, the Bureau shall examine it with respect to the provisions referred to in *resolves* 1.1.1 above, including the commitment referred to in *resolves* 1.1.1.1 above, and publish the result of such examination in the International Frequency Information Circular (BR IFIC);
- 1.1.2 the notifying administration of the non-GSO FSS system with which the ESIMs communicate shall ensure that the operation of ESIMs complies with the coordination agreements obtained for the frequency assignments of the typical earth station of this non-GSO FSS system obtained under the provisions of Article 9 of the Radio Regulations, taking into account *recognizing b)* above;
- 1.1.2bis notifying administrations of the non-GSO FSS system with which the ESIMs communicate shall ensure that non-GSO ESIMs comply with the epfd limits referred to in Nos. **22.5C**, **22.5D** and **22.5F** for the protection of GSO FSS networks operating in the frequency bands 17.8-18.6 GHz, 19.7-20.2 GHz (space-to-Earth), 27.5-28.6 GHz and 29.5-30 GHz (Earth-to-space);
- 1.1.3 non-GSO ESIMs shall not claim protection from broadcasting-satellite service feeder-link earth stations operating in accordance with the Radio Regulations in the frequency band 17.7-18.4 GHz;
- 1.1.4 with respect to EESS (passive) operating in the frequency band 18.6-18.8 GHz, certain non-GSO FSS system with an orbital apogee of less than 20 000 km operating in the frequency bands 18.3-18.6 GHz and 18.8-19.1 GHz with which aeronautical and/or maritime ESIMs communicate and for which the complete notification information has been received by the Radiocommunication Bureau after 1 January 2025 shall comply with the provisions indicated in Annex 3 to this Resolution;
- 1.1.4.1 for the implementation of *resolves* 1.1.4 above, the notifying administration for the non-GSO FSS system with which the non-GSO ESIMs communicate shall send to the BR the relevant Appendix 4 notification information including the commitment that the operation shall be in conformity with *resolves* 1.1.4,
- 1.2 with respect to terrestrial services in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz, 27.5-29.1 GHz, and 29.5-30 GHz non-GSO ESIMs shall comply with the following conditions:
- 1.2.1 receiving non-GSO ESIMs in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz, and 19.7-20.2 GHz (*see* No. **5.524**) shall not claim protection from terrestrial services to which the frequency bands are allocated and that operate in accordance with the Radio Regulations;
- 1.2.2 transmitting non-GSO ESIMs in the frequency band 27.5-29.1 GHz shall not cause unacceptable interference to terrestrial services to which the frequency band is allocated and that operate in accordance with the Radio Regulations, and Annex 1 to this Resolution shall apply;
- 1.2.3 transmitting non-GSO ESIMs in the frequency band 29.5-30.0 GHz shall not adversely affect the operations of terrestrial services to which this frequency band is

allocated and that operate in accordance with the Radio Regulations, and limits in Annex 1 to this Resolution shall apply with respect to administrations mentioned in No. 5.542;

- 1.2.4 the provisions in this Resolution, including Annex 1, set the conditions for the purpose of protecting terrestrial services from unacceptable interference from aeronautical and maritime non-GSO ESIM in neighbouring countries in accordance with the provisions included in *resolves* 1.2.2 above; however, the requirement not to cause unacceptable interference to, or claim protection from, terrestrial services to which the frequency band is allocated and operating in accordance with the Radio Regulations remains valid (see *resolves* 6);
- 1.2.5 the Bureau shall examine, in accordance with the provisions included in *resolves* 1.2.2 above and with the methodology in Annex 2, the characteristics of aeronautical non-GSO ESIM with respect to the conformity with the power flux-density limits specified in Part 2 of Annex 1 to this Resolution and publish the results of such examination in the BR IFIC;
- 2 that non-GSO ESIMs shall not be used or relied upon for safety-of-life applications;
- 3 that the operation of non-GSO ESIMs within the territory, including territorial waters and airspace of an administration, shall be carried out only if authorized by that administration;
- 4 that the notifying administrations of those non-GSO FSS systems with which non-GSO ESIMs in the frequency bands in *considering a)* above are intended to operate shall submit a commitment to the Bureau to immediately act to eliminate unacceptable interference or reduce interference to an acceptable level upon receiving a report of unacceptable interference (see *resolves* 5);
- 5 that the notifying administration of the non-GSO FSS system with which non-GSO ESIMs communicate shall ensure:
- 5.1 that all necessary measures are taken so that non-GSO ESIMs are subject to permanent monitoring and control by a network control and monitoring centre (NCCM) or equivalent facility in order to comply with the provisions in this Resolution, and are capable of receiving and acting upon at least “enable transmission” and “disable transmission” commands from the NCCM or equivalent facility;
- 5.2 that measures, when required, are taken to limit the operation of non-GSO ESIMs in the territory, including territorial waters and territorial airspace, under the jurisdiction of the administrations authorizing non-GSO ESIMs;
- 5.3 that a permanent point of contact shall be designated and provided by the notifying administration of the non-GSO FSS satellite systems with which the above-mentioned non-GSO ESIMs communicate for the purpose of tracing any suspected cases of unacceptable interference from non-GSO ESIMs and to immediately respond to requests from the focal point of the authorizing administration;
- 6 that in case of unacceptable interference caused by any type of non-GSO ESIM(s):
- 6.1 the administration of the country in which the non-GSO ESIM(s) is authorized shall cooperate with an investigation on the matter and provide any required information on the operation of the ESIM(s) and a point of contact to provide such information;
- 6.2 the administration of the country in which the non-GSO ESIM(s) is authorized and the notifying administration of the non-GSO FSS system with which the aeronautical and maritime non-GSO ESIM(s) communicates shall, jointly or individually, as the case may be and to the extent of ability of the former

administration, upon receipt of a report of unacceptable interference, take required actions to eliminate or reduce unacceptable interference to an acceptable level;

7 that the application of this Resolution does not provide regulatory status to non-GSO ESIMs different from that derived from the non-GSO FSS system with which they communicate, taking into account the provisions referred to in this Resolution (see *recognizing b*) above);

resolves further

1 that frequency assignments to non-GSO ESIMs shall be notified by the notifying administration of the satellite system in the fixed-satellite service with which ESIMs communicate;

2 that, the notifying administration of the satellite system shall ensure that non-GSO ESIMs operate only in the territory under the jurisdiction of any administration/country from which an authorization has been obtained, taking into account *recognizing further c*) above;

3 that for the implementation of *resolves further 2* above, the notifying administration of the non-GSO FSS system with which the non-GSO ESIMs communicate shall ensure that the ESIMs are designed and operated so as to cease transmission over the territory of any administration/country from which authorization has not been obtained;

4 that the authorization to non-GSO ESIMs to operate in the territory under the jurisdiction of an administration shall in no way release the notifying administration of the satellite system with which the non-GSO ESIMs communicate from the obligation to comply with the provisions included in this Resolution and those contained in the Radio Regulations;

5 that, should an administration authorizing aeronautical non-GSO ESIMs agree to pfd levels higher than the limits contained in Part 2 of Annex 1 to this Resolution within the territory under its jurisdiction, such agreement shall not affect other countries that are not party to that agreement,

instructs the Director of the Radiocommunication Bureau

1 to take all necessary actions to facilitate the implementation of this Resolution, together with providing any assistance for the resolution of interference, when required;

2 to report to future world radiocommunication conferences any difficulties or inconsistencies encountered in the implementation of this Resolution, including whether or not the responsibilities relating to the operation of aeronautical and maritime non-GSO ESIM have been properly addressed;

3 not to examine, under No. **11.31**, the conformity of non-GSO FSS systems with the provisions of *resolves 1.1.4* of this Resolution;

invites administrations

to collaborate for the implementation of this Resolution, in particular for resolving interference, if any,

instructs the Secretary-General

to bring this Resolution to the attention of the Secretary-General of the International Maritime Organization and of the Secretary General of the International Civil Aviation Organization.

ANNEX 1 TO DRAFT NEW RESOLUTION [A116] (WRC-23)

**Provisions for maritime and aeronautical non-GSO ESIMs to protect
terrestrial services operating in the frequency band 27.5-29.1 GHz, and for
the frequency band 29.5-30.0 GHz on the territories of administrations
mentioned
in No. 5.542 (see No. 5.542)**

The parts below contain provisions to ensure that maritime and aeronautical non-GSO ESIMs do not cause unacceptable interference in neighbouring countries to terrestrial service operations when non-GSO ESIMs operate in frequencies overlapping with those used by terrestrial services at any time to which the frequency band 27.5-29.1 GHz is allocated and that operate in accordance with the Radio Regulations. The provisions in the parts below could also be used as guidance to prevent the operation of the non-GSO ESIMs in the frequency band 29.5-30 GHz from adversely impacting the secondary terrestrial services operating pursuant to No. 5.542 of the Radio Regulations.

PART 1: MARITIME NON-GSO ESIMs

1 The notifying administration of the non-GSO FSS system with which a maritime non-GSO ESIMs communicate shall ensure compliance of the maritime non-GSO ESIMs operating within the frequency band 27.5-29.1 GHz or parts thereof, with both of the following conditions for the protection of terrestrial services to which the frequency band is allocated within a coastal State:

1.1 The minimum distance from the low-water mark as officially recognized by the coastal State beyond which maritime non-GSO ESIMs can operate without the prior agreement of any administration is 70 km. Any transmissions from maritime ESIM within the minimum distance shall be subject to the prior agreement of the coastal State(s) concerned.

1.2 The maximum maritime non-GSO ESIM e.i.r.p. spectral density towards the territory of any coastal State will be limited to 12.98 dBW in a reference bandwidth of 1 MHz or 24.44 dBW in a reference bandwidth of 14 MHz. Transmissions from maritime non-GSO ESIMs with higher e.i.r.p. spectral density levels towards the territory of any coastal state shall be subject to the prior agreement of the coastal State(s) concerned.

PART 2: AERONAUTICAL NON-GSO ESIMs

2 The notifying administration of the non-GSO FSS satellite system with which aeronautical ESIMs communicate shall ensure compliance of the aeronautical ESIMs operating within the frequency bands 27.5-29.1 GHz, or parts thereof, with all of the following conditions for the protection of terrestrial services to which the frequency band is allocated:

2.1 When within line-of-sight of the territory of an administration, and above an altitude of 3 km, the maximum pfd produced at the surface of the Earth on the territory of an administration by emissions from a single aeronautical non-GSO ESIMs shall not exceed:

$$\begin{aligned} \text{pfd}(\theta) &= -124.7 && (\text{dB(W/(m}^2 \cdot 14 \text{ MHz)))} && \text{for } 0^\circ \leq \theta \leq 0.01^\circ \\ \text{pfd}(\theta) &= -120.9 + 1.9 \cdot \log\theta && (\text{dB(W/(m}^2 \cdot 14 \text{ MHz)))} && \text{for } 0.01^\circ < \theta \leq 0.3^\circ \\ \text{pfd}(\theta) &= -116.2 + 11 \cdot \log\theta && (\text{dB(W/(m}^2 \cdot 14 \text{ MHz)))} && \text{for } 0.3^\circ < \theta \leq 1^\circ \\ \text{pfd}(\theta) &= -116.2 + 18 \cdot \log\theta && (\text{dB(W/(m}^2 \cdot 14 \text{ MHz)))} && \text{for } 1^\circ < \theta \leq 2^\circ \\ \text{pfd}(\theta) &= -117.9 + 23.7 \cdot \log\theta && (\text{dB(W/(m}^2 \cdot 14 \text{ MHz)))} && \text{for } 2^\circ < \theta \leq 8^\circ \\ \text{pfd}(\theta) &= -96.5 && (\text{dB(W/(m}^2 \cdot 14 \text{ MHz)))} && \text{for } 8^\circ < \theta \leq 90.0^\circ \end{aligned}$$

where θ is the angle of arrival of the radio-frequency wave (degrees above the horizon).

2.2 When within line-of-sight of the territory of an administration, and up to an altitude of 3 km, the maximum pfd produced at the surface of the Earth on the territory of an administration by emissions from a single aeronautical ESIM shall not exceed:

$$\begin{aligned} \text{pfd}(\theta) &= -136.2 && (\text{dB(W/(m}^2 \cdot 1 \text{ MHz)))} && \text{for } 0^\circ \leq \theta \leq 0.01^\circ \\ \text{pfd}(\theta) &= -132.4 + 1.9 \cdot \log\theta && (\text{dB(W/(m}^2 \cdot 1 \text{ MHz)))} && \text{for } 0.01^\circ < \theta \leq 0.3^\circ \\ \text{pfd}(\theta) &= -127.7 + 11 \cdot \log\theta && (\text{dB(W/(m}^2 \cdot 1 \text{ MHz)))} && \text{for } 0.3^\circ < \theta \leq 1^\circ \\ \text{pfd}(\theta) &= -127.7 + 18 \cdot \log\theta && (\text{dB(W/(m}^2 \cdot 1 \text{ MHz)))} && \text{for } 1^\circ < \theta \leq 12.4^\circ \\ \text{pfd}(\theta) &= -108 && (\text{dB(W/(m}^2 \cdot 1 \text{ MHz)))} && \text{for } 12.4^\circ < \theta \leq 90^\circ \end{aligned}$$

where θ is the angle of arrival of the radio-frequency wave (degrees above the horizon).

2.3 Aeronautical ESIMs operating in the 27.5-29.5 GHz band, or parts thereof, within the territory of an administration that has authorized fixed-service and/or mobile-service operation in the same frequency bands shall not transmit in these frequency bands without prior agreement of that administration (see also *resolves* 3 of this Resolution).

2.4 The maximum power in the out-of-band domain should be attenuated below the maximum output power of the aeronautical ESIM transmitter as described in Annex 5 to Recommendation ITU-R SM.1541.

ANNEX 2 TO DRAFT NEW RESOLUTION [A116] (WRC-23)

Methodology with respect to the examination referred to in *resolves* 1.2.2

I. 1 OVERVIEW OF THE METHODOLOGY

Aeronautical earth station in motion (A-ESIMs) can operate over time at different locations defined by latitude, longitude and altitude. This methodology determines the maximum allowable off-axis e.i.r.p. spectral density (“ $EIRP_C$ ”) for an A-ESIM transmitter communicating with a non-GSO FSS satellite that would ensure compliance with a set of pre-established power flux-density (pfd) limits defined on the Earth’s surface. This methodology derives the $EIRP_C$ considering the relevant loss and attenuation in the geometry considered, among other things.

The methodology then compares the computed $EIRP_C$ with the reference off-axis e.i.r.p. towards the ground (“ $EIRP_R$ ”) of the A-ESIM. For each emission in each group of a non-GSO satellite system, $EIRP_R$ can be calculated by using the Appendix 4 data for that system as well as other input parameters that shall be provided by the notifying administration for that system.

Specifically, for each emission in the ITU non-GSO satellite system associated with a to-be-defined non-GSO A-ESIM class of station, the $EIRP_R$ is the algebraic summation (in logarithmic terms) of the maximum power at the antenna flange (item C.8.a.1 of Appendix 4), the peak gain of the A-ESIM antenna (item C.10.d.3 of Appendix 4), the maximum achievable off-axis gain isolation towards the ground of the A-ESIM antenna and a parameter that would compensate for any difference between the emission bandwidth and the reference bandwidth of the pre-established set of pfd limits.

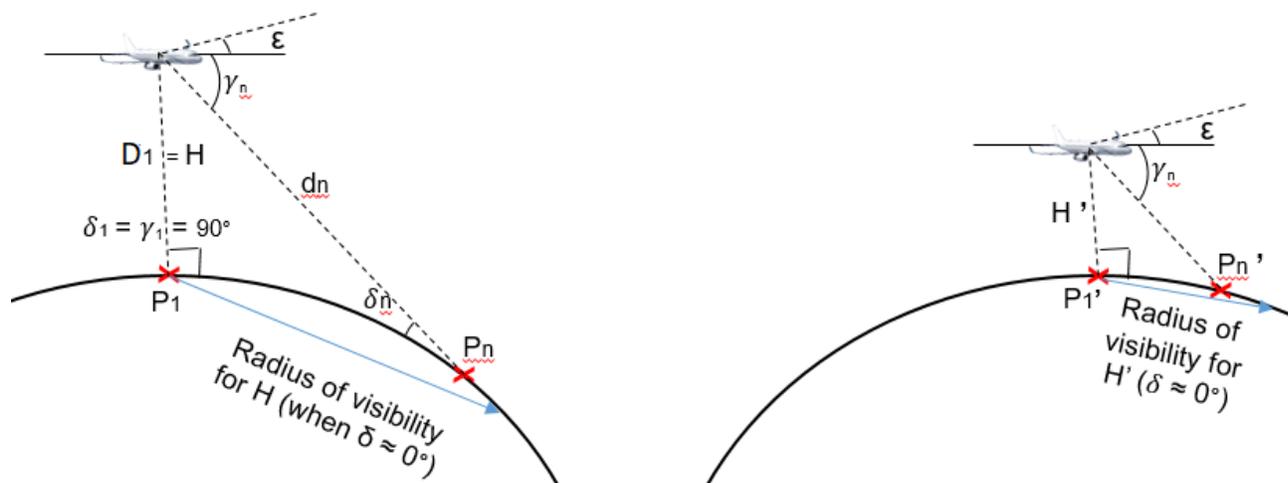
The operations of A-ESIMs shall be evaluated over multiple predefined altitude ranges in order to establish as many $EIRP_C$ levels for comparison with $EIRP_R$. This comparison is at the basis of the methodology and examination that are described more in detail in the following section. An examination by the Bureau would apply this methodology for each altitude range, to determine whether the A-ESIMs operating under a given ITU non-GSO satellite network would comply with the PFD limits defined on the Earth’s surface to protect terrestrial services.

II. 2 PARAMETERS AND GEOMETRY

Figure A.2.1 provides a description of the geometry considered under this methodology. The figure shows A-ESIMs flying at two different altitudes and also some of the parameters used for the calculation. The model is agnostic to non-GSO ESIMs geographical locations on Earth and assumes a spherical Earth model with a fixed radius for the calculation.

FIGURE A2-1

Geometry for the examination of compliance for two different A-ESIM altitudes



The notifying administration for the non-GSO FSS network with which A-ESIMs communicates shall send to the Bureau the relevant characteristics of A-ESIMs intended to communicate with that non-GSO FSS network. All the parameters required by the Bureau to carry out the examination process are listed and briefly described in Table A2-1. Additional considerations are further elaborated in section 3.

TABLE A2-1

Relevant parameters for pfd compliance examination

Parameter	Symbol	Type of parameter	Observation
Aeronautical non-GSO ESIM altitude	H	Established by the methodology as: $H_{min}=0.01$ km, $H_{max}=15$ km	The altitudes at which the examination is carried out range from H_{min} to H_{max} at the following altitudes: H_{min} , 1.01 km, 2.01 km, 3.00 km, 3.01 km, 4.01 km... H_{max}
Angle of arrival of the incident wave on the Earth's surface	δ	Specified by the pre-established set(s) of pfd limits, variable from 0° to 90°	pre-established set(s) of pfd should cover incident angles from 0° to 90°
Angle below the horizontal plane of the ESIM corresponding to the angle of arrival δ under examination	γ	Calculated from the geometry	This angle is calculated considering the non-GSO ESIM's altitude H_j examined and angle of arrival δ under examination (see Fig. A.2.1)
Distance between the ESIM and the point on the ground under examination	D	Calculated from the geometry	This distance is a function of the A-ESIM's altitude and the angles δ and γ
Frequency	f	Provided by the Appendix 4 data	To evaluate the propagation loss either at the center frequency or at the upper and lower limits of the frequency range
Atmospheric loss	L_{atm}	Calculated and established by the methodology	Based on Recommendation ITU-R P.676
Fuselage attenuation	L_f	Report ITU-R M.2221-0 or other ITU-R Reports or Recommendations	The attenuation depends on the angle γ below the horizontal plane of the non-GSO ESIM. The value(s) could come from ITU-R Reports and/or Recommendations, such as Report ITU-R M.2221. Note, the model contained in Report ITU-R M.2221-0 might require updating and/or clarifications.
A-ESIM antenna peak gain and off-axis gain pattern	$G_{max}, G(\theta)$	Taken from the Appendix 4 data (items C.10.d.3 and C.10.d.5.a.1, respectively) of the non-GSO system under examination	The A-ESIM antenna gain is used to compute $EIRP_R$
Emission bandwidth	$BW_{Emission}$	Taken from the Appendix 4 data (as part of item C.7.a) of the non-GSO system under examination	These two bandwidths shall be compared and a correcting factor needs to be included in the computation of $EIRP_R$ in case $BW_{Emission} < BW_{Ref}$
Reference bandwidth	BW_{Ref}	Taken from the set(s) of pre-established pfd limits	

Effective isotropic radiated power required for compliance with the pfd limits in a reference bandwidth	$EIRP_C$	$EIRP_C$ is the result of the calculation; it depends on the ESIM altitude and the angle of arrival (θ) of the incident wave on the Earth's surface	For each of the altitudes H_j , the e.i.r.p. for compliance is calculated for the different incident angles (θ) considered to cover all the range of the pfd limits to be established by WRC-23. This leads to a number of values of $EIRP_C$ associated to a given altitude H_j ; for each altitude H_j , the lowest e.i.r.p. value is the one to be retained and compared with $EIRP_R$ (see section 3)
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Note: No additional loss figure for polarisation discrimination is considered because it is likely captured in the calculation of fuselage attenuation.

III. 3 CALCULATION PROCEDURE

This section includes a step-to-step description of how the examination methodology would be implemented for a given group associated to the class of earth station for non-GSO A-ESIMs in a non-GSO satellite system.

START

Calculate $EIRP_R$

- i) For each of the emissions included in the Group under consideration, compute the Reference EIRP ($EIRP_R$, dB(W)) as:

$$EIRP_R = G_{Max} - G_{Isol_{Max}} + P_{Max} + 10 \log_{10}(BW) \quad (1)$$

where:

G_{max} is the A-ESIM antenna peak gain in dBi

G_{Isol_Max} is the maximum achievable gain isolation of the A-ESIM antenna towards the ground in dB when operating in the examined non-GSO system

P_{max} is the maximum power density at the A-ESIM antenna flange in dB(W/Hz).

BW in Hz is:

$$BW_{Ref} \text{ if } BW_{emission} > BW_{Ref}$$

$$BW_{emission} \text{ if } BW_{emission} < BW_{Ref}$$

Calculate $EIRP_C$

- ii) For each aircraft altitude, it is necessary to generate as many θ_n angles (angle of arrival of the incident wave) as required in order to test the full compliance with the set(s) of pre-established pfd limits. The N angles θ_n shall be comprised between 0° and 90° and have a resolution compatible with the granularity of the pre-established pfd limits. Each of the angles θ_n will correspond to as many N points on the ground.
- iii) For each altitude $H_j = H_{min}, \dots, H_{max}$, compute $EIRP_{C_j}$ using the following algorithm
 - a) Set the altitude of the A_ESIM to H_j

- b) Compute the angle below the horizon $\gamma_{j,n}$ as seen from the A-ESIM for each of the N angles δ_n generated in ii) using the following equation:

$$\gamma_{j,n} = \arccos \left(\frac{R_e \cdot \cos(\delta_n)}{(R_e + H_j)} \right) \quad (2)$$

where R_e is the mean Earth radius.

- c) Compute the distance $D_{j,n}$, in km, for $n=1, \dots, N$ between the A-ESIMs and the tested point on the ground:

$$D_{j,n} = \sqrt{R_e^2 + (R_e + H_j)^2 - 2 R_e (R_e + H_j) \cos(\gamma_n - \delta_n)} \quad (3)$$

- d) Compute the fuselage attenuation $L_{f,j,n}$ (dB) applicable to each of the N points on the ground as a function of the angles $\gamma_{j,n}$ computed in b) above
- e) Compute the atmospheric loss $L_{atm,j,n}$ (dB) applicable to each of the distances $D_{j,n}$ computed in c) above
- f) Compute the $EIRP_{C,j,n}$ (dB(W/BW_{Ref})), that is the maximum e.i.r.p. that can be radiated in the pfd mask's reference bandwidth by the A-ESIM towards each of the N points to be compliant with the set(s) of pre-established pfd limits, as per the following equation:

$$EIRP_{C,j,n}(\delta_n, \gamma_n) = pfd(\delta_n) + 10 \log_{10}(4\pi(D_{j,n} \cdot 1000)^2) + L_{f,j,n} + L_{atm,j,n} \quad (4)$$

- g) Compute the minimum $EIRP_{C,j}$ across all values calculated at the previous step, $EIRP_{C,j} = \text{Min}(EIRP_{C,j,n}(\delta_n, \gamma_n))$. The output of this last step is the maximum $EIRP_C$ that can be radiated by the A-ESIM to ensure it complies with the set(s) of pre-established pfd limits with respect to all angles δ_n at the altitude H_j . There will be one $EIRP_{C,j}$ for each of the H_j altitudes considered.

The output of step iii) is summarised in Table A2-2 below:

TABLE A2-2
Computed $EIRP_{C,j}$ values

j	H_j (km)	$EIRP_{C,j,n}(\delta_n, \gamma_n)$ dB(W/BW _{Ref})				$EIRP_{C,j}$ dB(W/BW _{Ref})
		$\delta = 0^\circ$	$\delta = 0.01^\circ$...	$\delta = 90^\circ$	
1	H_{min}	xxx	xxx	xxx	xxx	XXX
2	...	yyy	yyy	yyy	yyy	YYY

...
j_{max}	H_{max}	zzz	zzz	zzz	zzz	zzz

Compare $EIRP_C$ and $EIRP_R$, and produce an examination finding

- iv) For each of the emissions, check whether $EIRP_{C_j} > EIRP_R$. The results of this check are illustrated in Table A2-3 below.

TABLE A2-3

Comparison between $EIRP_{C_j}$ and $EIRP_R$

Group ID	Emission n.	$EIRP_R$ dB(W)	Is there at least one altitude H_j for which $EIRP_{C_j} > EIRP_R$?	Smallest H_j for which $EIRP_{C_j} > EIRP_R$ (km)
X	1	XXX	Yes/No	AAA
Y	2	YYY	Yes/No	BBB
...
Z	N	ZZZ	Yes/No	CCC

- v) For the emissions included in the Group under examination which pass the test detailed in iv) above, the results of the Bureau's examination for that Group is ***favorable*** (after removing emissions that have failed the examination), otherwise it is ***unfavorable***.
- vi) The Bureau shall publish:
- The finding (favorable or unfavorable) for each Group of the non-GSO system examined;
 - Table A2-3, that is the output of step iii) of the algorithm.

Note: As part of standard procedure, the Bureau would publish the emissions with unfavourable findings in BR IFIC Part III-S, which concerns frequency assignments that are returned to the responsible administration.

IV.

ANNEX 3 TO DRAFT NEW RESOLUTION [A116] (WRC-23)

Provisions for non-GSO FSS systems¹ transmitting to aeronautical and/or maritime ESIMs operating in or over an ocean in the frequency bands 18.3-18.6 GHz and 18.8-19.1 GHz with respect to EESS (passive) operating in the frequency band 18.6-18.8 GHz (in accordance with *resolves* 1.1.4)

Any non-GSO fixed satellite space station operating in the frequency bands 18.3-18.6 GHz and 18.8-19.1 GHz with with (i) an orbit apogee less than 20 000 km (ii) communicating with an aeronautical or maritime ESIM over the ocean, and (iii) for which complete notification information has been received by the Radiocommunication Bureau after 1 January 2025, shall not exceed an unwanted emission power flux-density produced at the surface of the ocean in the 18.6-18.8 GHz band, based on the following piecewise equation:

$$\begin{aligned} \text{for } N \geq 10: \quad pfd &= \min(-77 - 10 * \log(S), -110) && \text{dB(W)/(m}^2 \cdot 200 \text{ MHz)} \\ \text{for } N < 10: \quad pfd &= \min(-67 - 10 * \log(S) - 10 * \log(N), -110) && \text{dB(W)/(m}^2 \cdot 200 \text{ MHz)} \end{aligned}$$

where S is the non-GSO fixed satellite space station 3 dB beam footprint area on the ground expressed in km^2 and N is the maximum number of co-frequency beams generated by the non-GSO fixed satellite system within a $10\,000\,000 \text{ km}^2$ square on the Earth;

¹ These provisions do not apply to non-GSO systems using orbits with an apogee less than 2000 km that employ a frequency reuse factor of at least three

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APPENDIX 4 (REV.WRC-19)

**Consolidated list and tables of characteristics for use in the
application of the procedures of Chapter III**

ANNEX 2

**Characteristics of satellite networks, earth stations
or radio astronomy stations² (Rev.WRC-19)**

Footnotes to Tables A, B, C and D

MOD

Items in Appendix	A - GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION

A.20	COMPLIANCE WITH <i>resolves</i> 1.1.4 OF RESOLUTION 169 (WRC-19)
A.20.a	a commitment that the ESIM operation would be in conformity with the Radio Regulations and Resolution 169 (WRC-19) Required only for the notification of earth stations in motion submitted in accordance with Resolution 169 (WRC-19)
A.21	COMPLIANCE WITH <i>resolves</i> 1.2.6 OF RESOLUTION 169 (WRC-19)
A.21.a	a commitment that, upon receiving a report of unacceptable interference, the notifying administration for the GSO FSS network with which ESIMs communicate shall follow the procedures in <i>resolves</i> 4 of Resolution 169 (WRC-19) Required only for the notification of earth stations in motion submitted in accordance with Resolution 169 (WRC-19)
A.22	COMPLIANCE WITH <i>resolves</i> 7 OF RESOLUTION 169 (WRC-19)
A.22.a	a commitment that aeronautical ESIMs would be in conformity with the pfd limits on the Earth's surface specified in Part II of Annex 3 to Resolution 169 (WRC-19) Required only for the notification of earth stations in motion submitted in accordance with Resolution 169 (WRC-19)
A.23	COMPLIANCE WITH RESOLUTION 35 (WRC-19)
A.23.a	a commitment stating that the characteristics as modified will not cause more interference or require more protection than the characteristics provided in the latest notification information published in Part I-S of the BR IFIC for the frequency assignments to the non-geostationary-satellite system
A.24	COMPLIANCE WITH NOTIFICATION OF A NON-GSO SHORT DURATION MISSION

Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network or system subject to coordination under Section II of Article 9	Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9	Notification of a geostationary-satellite network (including space operation functions under Article 2A)	Notification or coordination of a non-geostationary-satellite network or system	Notification or coordination of an earth station (including notification under Appendices 30A or 30B)	Notice for a satellite network in the broadcasting-satellite service under Appendix 30 (Articles 4 and 5)	Notice for a satellite network (feeder-link) under Appendix 30A (Articles 4 and 5)	Notice for a satellite network in the fixed-satellite service under Appendix 30B (Articles 6 and 8)	Items in Appendix	Radio astronomy
			+						A.20	
			+						A.20.a	
			+						A.21	
			+						A.21.a	
			+						A.22	
			+						A.22.a	
									A.23	
				0					A.23.a	
									A.24	

Items in Appendix	<p align="center">A - GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION</p>
A.24.a	<p>a commitment by the administration that, in the case that unacceptable interference caused by a non-GSO satellite network or system identified as short-duration mission in accordance with Resolution 32 (WRC-19) is not resolved, the administration shall undertake steps to eliminate the interference or reduce it to an acceptable level</p> <p>Required only for notification</p> <p><u>A.25</u> <u>COMPLIANCE WITH resolves 1.1.1.1 OF RESOLUTION [A116] (WRC-23)</u></p>
<u>A.25.a</u>	<p><u>a commitment that the ESIM operation would be in conformity with the Radio Regulations and Resolution [A116] (WRC-23)</u></p> <p><u>Required only for the notification of earth stations in motion submitted in accordance with Resolution [A116] (WRC-23)</u></p>
<u>A.26</u>	<p><u>COMPLIANCE WITH resolves 1.1.4 OF RESOLUTION [A116] (WRC-23)</u></p>
A.26.a	<p><u>a commitment that the ESIM operation would be in conformity with the resolves 1.1.4 of Resolution [A116] (WRC-23)</u></p> <p><u>Required only for the notification of earth stations in motion submitted in accordance with Resolution [A116] (WRC-23)</u></p>
<u>A.267</u>	<p><u>COMPLIANCE WITH resolves 4 OF RESOLUTION [A116] (WRC-23)</u></p>
A.247.a	<p><u>a commitment that, upon receiving a report of unacceptable interference, the notifying administration for the GSO FSS network with which ESIMs communicate shall follow the procedures in resolves 5 of Resolution [A116] (WRC-23)</u></p> <p><u>Required only for the notification of earth stations in motion submitted in accordance with Resolution [A116] (WRC-23)</u></p>
<u>A.278</u>	<p><u>COMPLIANCE WITH resolves 1.2.2 OF RESOLUTION [A116] (WRC-23)</u></p>

Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network or system subject to coordination under Section II of Article 9	Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9	Notification or coordination of a non-geostationary-satellite network (including space operation functions under Article 2A)	Notification or coordination of a non-geostationary-satellite network or system	Notification or coordination of an earth station (including notification under Appendices 30A or 30B)	Notice for a satellite network in the broadcasting-satellite service under Appendix 30 (Articles 4 and 5)	Notice for a satellite network (feeder-link) under Appendix 30A (Articles 4 and 5)	Notice for a satellite network in the fixed-satellite service under Appendix 30B (Articles 6 and 8)	Items in Appendix	Radio astronomy
	<u>A.25</u>	-		+					A.24a	
				I+					<u>A.25.a</u>	
	<u>A.26</u>									
				I+					<u>A.26.a</u>	
	<u>A.27</u>	-								
				I+					<u>A.27.a</u>	
	<u>A.28</u>	-								

Items in Appendix	<i>A - GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION</i>
A.278.a	a commitment that aeronautical ESIMs would be in conformity with the pfd limits on the Earth's surface specified in Part II of Annex 1 to Resolution [A116] (WRC-23) Required only for the notification of earth stations in motion submitted in accordance with Resolution [A116] (WRC-23)

Reasons: Consequential

Advance publication of a geostationary-satellite network	
Advance publication of a non-geostationary-satellite network or system subject to coordination under Section II of Article 9	
Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9	
Notification or coordination of a geostationary-satellite network (including space operation functions under Article 2A)	
Notification or coordination of a non-geostationary-satellite network or system	+
Notification or coordination of an earth station (including notification under Appendices 30A or 30B)	
Notice for a satellite network in the broadcasting-satellite service under Appendix 30 (Articles 4 and 5)	
Notice for a satellite network (feeder-link) under Appendix 30A (Articles 4 and 5)	
Notice for a satellite network in the fixed-satellite service under Appendix 30B (Articles 6 and 8)	
Items in Appendix	A.28.a
Radio astronomy	

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RESOLUTION 173 (WRC-19)

Use of the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service

Reasons: Consequential